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Episodic Heavy Drinking and Marijuana Use Among Undergraduate Students at Western Kentucky University

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EPISODIC HEAVY DRINKING AND MARIJUANA USE AMONG UNDERGRADUATE STUDENTS AT WESTERN KENTUCKY UNIVERSITY

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Abstract

Research has documented that Episodic Heavy Drinking (EHD), defined as consuming four or more and five or more alcoholic drinks per drinking episode among females and males, respectively, is a prevalent risk behavior among undergraduate college students throughout the United States. Moreover, studies have shown that EHD is the leading cause of preventable morbidity and mortality among college students as unintentional injuries, sexual assaults, and unsafe sexual behaviors among this population have been linked to this risk behavior.

Illicit substance use, although often portrayed as a separate risk behavior, is also associated with EHD. Nationally, the most frequently used illicit substance among college students is marijuana. Research suggests that college students who engage in EHD are several times more likely to be current marijuana users or to have used marijuana during their lifetime. Furthermore, EHD has been identified as a predictor of marijuana use and other substances, illicit or otherwise.

With regard to this particular investigation, three specific risk behaviors among undergraduate students at Western Kentucky University (WKU) were the primary foci: 1) the prevalence of alcohol use and episodic heavy drinking (EHD), 2) the prevalence of illicit substance use, particularly marijuana use, and 3) concomitant EHD and marijuana use. In addition, WKU students' personal characteristics and certain behaviors were examined to determine their association with alcohol and marijuana use.

This study was a secondary analysis of data gathered through the Western Kentucky Student Health Assessment (WKU-SHA 2002) administered during the fall semester of 2002. The WKU-SHA 2002 utilized the American College Health Association's (ACHA) National College Health Assessment (NCHA) survey instrument to investigate overall health status and

health risk behaviors of WKU undergraduate students. It used a cross-sectional, random cluster sampling of 100, 200, 300 and 400 level undergraduate classes held on WKU's main campus.

Results of this investigation were similar to findings reported in current literature. Seventy-three percent of respondents reported consuming alcohol during the last 30 days. Forty-six percent reported engaging in episodic heavy drinking the last time they "partied" and approximately 20% reported using marijuana during the last 30 days. Episodic heavy drinkers were more likely to report 30-day marijuana use than students who did not engage in EHD. Significant associations were reported between risk behaviors and respondents' characteristics.

It is anticipated that the information provided through this investigation may be particularly useful to the planning of future health programs and services designed to address EHD and marijuana use among WKU undergraduate college students.

Introduction

The Centers for Disease Control and Prevention (CDC) has comprehensively monitored the health risk behaviors of adolescents and young adults (aged 12 to 21 years) in the United States through the Youth Risk Behavior Surveillance System (YRBSS) since 1992. Developed in 1990 with the first survey administered to 9th through 12th graders in 1992, the YRBSS has examined students' participation in a variety of health risk behaviors including tobacco use, unhealthy dietary practices, inadequate physical activity, alcohol and other drug use, sexual behaviors that contribute to unintended pregnancy and sexually transmitted infections (STI), and behaviors that contribute to unintentional injuries and violence (CDC, 2004). These health risk behaviors, when initiated at childhood and/or adolescence, have been shown to significantly contribute to the leading causes of mortality, morbidity and/or problematic social issues in the country (CDC, 2004).

In 1995, the CDC first conducted the National College Health Risk Behavior Survey (NCHRBS), which was designed to measure the aforementioned health risk behaviors among college students (aged 18 years and older) in the United States (CDC, 1997). Results from the survey revealed that many college students across the country engaged in behaviors that put them at risk for chronic diseases, sexually transmitted infections, unintended pregnancy, unintentional injuries and/or other health problems (CDC, 1997). For example, 90% of college students reported that they had consumed alcohol during their lifetime with 68% doing so during the last 30 days (CDC, 1997). Forty-eight percent reported using marijuana during their lifetime, with 14% doing so during the last 30 days (CDC, 1997). In addition 35% of college students nationally had multiple (6± partners) sex partners during their lifetime and more than 70% reported that they did not use a condom the last time they had sexual intercourse (CDC, 1997).

In 1997, the American College Health Association (ACHA) developed the National College Health Assessment (NCHA) survey (ACHA, 2003). Using similar items from the NCHRBS, the NCHA survey instrument was developed to assess the health risk behaviors of college students. However, the NCHA survey instrument was made available to all ACHA member institutions across the country to allow for the assessment of student health risk behaviors at individual colleges and universities.

The NCHA questionnaire was pilot tested with college students during 1998-1999 academic year and the first formal NCHA survey was administered during the spring of 2000 (ACHA, 2003). After data had been collected and analyzed from college campuses across the country, additional changes to the survey instrument were made (ACHA, 2003). Since then, the NCHA has been widely utilized to assess the health risk behaviors of students on college campuses nationwide. At a reasonable fee, researchers at ACHA member institutions may utilize the NCHA survey instrument to conduct health assessments on their campus. Researchers can then compare health risk behaviors of their students to those of students across the country.

During the Fall 2002 semester, researchers at Western Kentucky University (WKU) conducted the WKU Student Health Assessment (WKU-SHA 2002) utilizing the American College Health Association's (ACHA) National College Health Assessment (NCHA) survey instrument. The principal investigator of the WKU-SHA 2002 was Dr. Lisa Lindley, a faculty member in the Department of Public Health. Dr. Lindley assembled a research team comprised of individuals representing different units within the university, namely the Department of Public Health, WKU Health Services, the Department of University Experience, the WKU Health & Fitness Laboratory, and WKU Housing & Residence Life. Because a comprehensive assessment of health risk behaviors among undergraduate students had never been undertaken at WKU, the

specific health issues and concerns of WKU students had never been identified. Thus, during the Fall 2002 semester, the WKU-SHA 2002 was conducted to assess the health risk behaviors and general well being of undergraduate students at Western Kentucky University.

Literature Review

EHD Terminology

Binge or episodic heavy drinking (EHD) has been recognized as one of the most common risk behaviors in which college students engage. Until the mid 1990's, EHD was generally defined as consuming five or more alcoholic drinks per drinking episode for both males and females (Wechsler H., Dowdall, G., Davenport, A., Rimm, E., 1995). In 1995, Henry Wechsler, a prominent researcher in college drinking, provided a more gender-specific measure of EHD (Wechsler, H., et. al., 1995). Wechsler and his colleagues defined EHD as the consumption of five or more alcoholic drinks per drinking episode for males and consumption of four or more alcoholic drinks per drinking episode for females. As a standard measure, it is generally accepted that a glass of wine, a can of beer, a shot of distilled spirits, or a bottle of wine cooler is equivalent to one alcoholic drink (Wilson, R., Kolander, C., 2000). Although not always accurate, on average, the amount of ethyl alcohol in each of the aforementioned examples is approximately 0.49 oz. per drink or per serving (Wilson, R., Kolander, C., 2000).

The establishment of separate definitions for EHD was based on gender-specific physiological differences related to alcohol metabolism. Referring to previous studies, Wechsler contended that males have a higher tolerance for alcohol compared to females. One reason is the lower rate of gastric metabolism of alcohol among females. Specifically, women produce lower levels of the alcohol dehydrogenase (ADH) enzyme, which is primarily responsible for alcohol's initial breakdown in the stomach, than men (National Institute on Alcohol Abuse and Alcoholism, 1997). Thus, higher levels of alcohol tend to enter the bloodstream of women. In addition, women have lower amounts of body water compared to men. This is analogous to

diluting a drop of alcohol in a pail of water among men and diluting a drop of alcohol in a glass of water among women (National Institute on Alcohol Abuse and Alcoholism, 1997).

This problematic risk behavior among college students has been described using various terms throughout the years. Since health behaviors have been shown to be associated with an individual's perception of their risk behaviors, the use of terminologies in this field are particularly important (Glanz, K., Rimer, B., Lewis, F., 2002; Clapp, J., Shillington, A. Segars, L., 2000). Until the late 1980s, researchers referred to EHD as "at risk drinking" (Lederman, L., Stewart, L., Goodhart, F., Laitman, L., 2003). This term was later abandoned because of research findings indicating use of the term appealed to college students, meaning students liked the idea of being labeled as "risk takers" (Lederman, L., et. al., 2003).

Currently, there is a movement within the public health research community to use the term "episodic heavy drinking" instead of "binge drinking". According to the literature, the term "binge drinking" has been taken out of context, as it typically refers to alcohol consumption continuously for two or more days while usual daily or routine activities take a back seat (Carpenter, J., 1998).

In 2003, another challenge to the use of the term "binge drinking" was brought forward. In its place, the term "dangerous drinking" was recommended (Lederman et al, 2003). Researchers made the contention that this term personalized the dangers of excessive alcohol consumption among college students. In fact, the term originated from college students themselves as they reportedly viewed excessive alcohol consumption as "dangerous" (Lederman et al, 2003).

EHD among College Students in the United States

Current research indicates that EHD is common among students enrolled in the more than 3,000 colleges and universities across the United States (Minto, S., Bennett, R., Keltner, B., Porterfield, D., 2002). It is estimated that EHD prevalence ranges from 41% to 44% within this population (Jones, S., Oeltmann, J., Wilson, T., Brener, N., Hill, C., 2001; Wechsler, H., Lee, J., Kuo, M., Seibring, M., Nelson, T., Lee, H., 2002). During the fall of 2002, the National College Health Assessment (NCHA) survey reported that 42% of college students nationally consumed five or more alcoholic drinks in one sitting during the last two weeks (ACHA, 2003). Approximately 54% of male students and 34.7% of female students consumed five or more alcoholic drinks in one sitting during the last two weeks (ACHA, 2003).

EHD and Problematic Behaviors

Problematic behaviors associated with EHD are well documented. According to the National Institute on Alcohol Abuse (NIAA) Task Force on College Drinking, an estimated 1,400 college students aged 18 to 24 years die annually from unintentional injuries including motor vehicle accidents that are alcohol-related (Preboth, M., 2002). In fact almost half of all motor vehicle crashes among 15 to 24 year olds are associated with alcohol use (Jones S., et. al, 2001). In the year 2001 alone, about 25% (2.1 million) of college students reported driving motor vehicles while the under the influence of alcohol (Preboth, M., 2002). More than three million college students have reported riding in a vehicle with a driver who was drinking or who drank alcohol prior to driving (Hingson, R., Heeren, T., Zakocs, R., Kopstein, A., Wechsler, H., 2002).

Variations in EHD have been reported across different demographic characteristics of college students. In a study published in 1999, various trends of EHD among college students were examined and compared over a three-year period (1994, 1995, and 1996) (Bennett, M., Miller, J., Woodall, W., 1999; Clapp, J. et. al., 2000). EHD rates among males were consistently higher than among females in some instances by as much as 16%. However, EHD among women has reported a consistent increasing trend while a fluctuating trend has been reported among men (Bennett, M., et. al., 1999; Clapp, J. et. al., 2000).

Additional variations in alcohol use and EHD have consistently been reported among undergraduate college students in the United States. Douglas and Collins (1997), in their report of the National College Health Risk Behavior Survey of 1995 (NCHRBS), stated that white college students were more likely to be current frequent users of alcohol and more likely to engage in EHD compared to African-American and Hispanic college students (Douglas, K., Collins, J., 1997). Another study reported that white students were more likely to engage in EHD compared to Asian American college students (Clapp, J., et. al., 2000).

In a study that tested a screening instrument for impaired driving among college students, results indicated that Caucasian students were at high risk because of their likelihood to engage in EHD (Schumacher, J, Usdan, S., McNamara, C., 2002). Windle (2003) further confirmed these findings in his study. He reported that Caucasian young adults (aged 18 to 24 years) had the highest prevalence of alcohol use while African Americans of the same age group had the lowest prevalence (Windle, M., 2003). Lower rates of alcohol consumption among African American college students have been partly explained by their affiliation with conservative Protestant Christian churches which greatly shun the use of alcohol among its members (Prendergast, M., 1994).

The Behavioral Risk Factor Surveillance System (BRFSS) of the Centers for Disease Control and Prevention reported in 1999 that individuals between the ages of 18 and 24 years consumed the greatest number of alcoholic drinks per sitting than any other age group (McKinnon, S., O'Rourke, K., Byrd, T., 2003). The NCHRBS reported similar findings with 18 to 24 year old college students engaging in EHD more often than older (25± years) college students (Douglas, K., Collins, J., 1997). Moreover, college students were more likely to engage in EHD than individuals of similar age who did not attend college and this was particularly true among students who attended four-year college institutions (Bennet, M., et. al., 1999; McKinnon, S. et. al., 2003).

Age at which an individual first consumes an alcoholic beverage has been significantly associated with EHD. Specifically, the younger the individual is when they consume their first alcoholic drink, the higher the frequency with which they consume alcohol and/or the higher the quantity of alcohol they consume (Prendergast, M., 1994). This phenomenon was demonstrated in a study of undergraduate students at one southern university, where students who initiated alcohol use at age 13 years or younger were three times more likely to be heavy drinkers than students who initiated alcohol at age 19 years and older (Prendergast, M., 1994.) Moreover, the earlier the age at which young people initiate alcohol use, the more likely they are to experience alcohol-related problems and/or dependency as they grow older (Windle , 2003).

Gfroerer and colleagues (1997) reported living arrangements as a significant predictor of alcohol and other substance abuse, including engaging in EHD among college students. The researchers found that college students who lived with their parents were least likely to report heavy alcohol use than students who lived in a dormitory or off campus (Gfroerer,J., Greenblatt, J., Wright, D., 1997). Students who lived with their parents reported less than half the rates of

alcohol use of other college students' who did not live with their parents (Gfroerer, J., et al., 1997). In addition, students who did not live with their parents were more than twice more likely than students who lived with their parents to report heavy alcohol use (Gfroerer, J., et al., 1997).

Although it is generally acknowledged that EHD is common among the undergraduate college population, notable varied observations have been reported based on geographic regions of the United States. For instance, a study by Wechsler and Fulop (1997) found that California college students drank alcohol less frequently than other college students throughout the country. California students were also less likely to engage in EHD and to suffer from its detrimental effects (Wechsler, H., Fulop, M., 1997). Two protective factors identified among California college students were age and marital status. In other words, California students were more likely to be older and to be married than college students nationally. Thus, they were less likely to live on campus where the EHD culture tends to be the norm.

McKinnon and colleagues (2003) identified that having a campus located next to the Mexican border added to the risk of students engaging in EHD. At their southwestern university, which was close to the Mexican border, current alcohol use and EHD were higher than the national and Texas state average among undergraduate college students attending four-year institutions (McKinnon, S., O'Rourke, K., Byrd, T., 2003). Being located next to the Mexican border for this university meant closer proximity to Ciudad Juarez, where the legal drinking age was lower and the cost of alcohol was cheaper (Mckinnon, S., et. al., 2003).

Violent behaviors linked to EHD among college students are also common. Each year approximately 600,000 college students are assaulted (with 70,000 being sexually assaulted) by their peers who are under the influence of alcohol (Preboth, M. 2002). Eleven percent of students reportedly destroy property after getting drunk (Preboth, M. 2002). Moreover, male

students are more likely to possess a firearm and/or be threatened with a firearm while in college if they engaged in EHD (Miller, M., Hemenway, D., Wechsler, H., 2002).

Other risk-taking behaviors among college students have been linked to EHD. NIAA estimates that approximately 400,000 college students had unsafe sex and 100,000 reported experiencing a memory blackout before engaging in a sexual act during the past year after engaging in EHD (Preboth, M. 2002). In addition, excessive alcohol use was found to be associated with college students having multiple sex partners and engaging in unsafe sex (Ogletree, R., Dinger, M., Vesely, S., 2001). These risk behaviors, often done concurrently by college students, greatly increase their risk of exposure to STIs (Ogletree, R., et. al., 2001). These data are particularly significant since the CDC estimated that annually, three million new cases of sexually transmitted infections (STIs) in the U.S. occur among persons aged 25 years or younger (Barth, K., Cook, R., Downs, J., Switzer, G, Fischhoff, B., 2002; Pluhar, E., Frongillo, E., Stycos, J., Dempster-McClain, D., 2003).

Another detrimental effect on the health of college students as a result of EHD is the increased risk of developing alcohol dependence. About six percent of college students have been diagnosed with this condition and nearly two percent tried to commit suicide because of alcohol-induced depression (Preboth, M. 2002). Hill and Chow (2002), in a study that examined alcohol use patterns and alcohol dependence among young men and women, reported that consumption of alcohol to intoxicating levels on a consistent basis often leads to increased tolerance and ultimately dependence (Hill, E., Chow, K., 2002). In a study that used a screening tool to identify college students with alcohol problems, more than 80% of respondents screened positive (answered “yes” to at least six of the ten questions) (Helmkamp, J., et. al., 2003). Of these, approximately 40% said they had to drink to EHD levels to feel the initial effects of

alcohol (Helmkamp, J., et. al., 2003). The authors pointed out that this suggested higher tolerance which is a prime indicator for physiological dependence to alcohol (Helmkamp, J., et. al., 2003).

For students who live on campus but do not engage in EHD, many reported being humiliated or insulted, physically assaulted, received unwanted sexual advances, and/or had their sleep and/or study hours interrupted by other students who engaged in EHD (Kuo, M, Adlaf, E., Lee, H., Gliksman, L., Demers, A., Wechsler, H., 2002). Furthermore, these students reported that they had cared for their colleagues who were suffering from adverse physiological effects of alcohol intoxication on one or more occasion (Kuo, M. et. al., 2002).

Marijuana Use among College Students in the United States

Marijuana is the most common illicit substance used by college students (Prendergast, M., 1994; Bennet, M., et. al. 1999). The 1995 NCHRBS reported that 43% of undergraduate college students in the U.S. had used marijuana during their lifetime and 17% were current marijuana users (operationalized as past 30-day use). Nearly seven percent reported lifetime use and one percent reported current use of cocaine (CDC, 1997). Sixteen percent reported lifetime use and three percent reported current use of other illegal drugs such as LSD, PCP, ecstasy and mushrooms (CDC, 1997).

According to the American College Health Association's (ACHA) National College Health Assessment (NCHA) survey, 21% of college students nationally reported using marijuana during the last 30 days and 40% used it during their lifetime (ACHA, 2003). According to the Harvard School of Public Health College Alcohol Study (HSPHCAS) surveys, lifetime use, 12-

month prevalence and 30-day prevalence of marijuana use among college students nationally increased between 1993 and 2001 (Mohler-Kuo, M., et al 2003).

Several demographic and behavioral characteristics have been significantly associated with marijuana use among college students. The 1995 NCHRBS reported that current marijuana use was higher among college students aged 18 to 24 years than among college students who were older (25± years) (CDC, 1997). Male and white college students were also significantly more likely to report current marijuana use than female and African American and Hispanic college students, respectively (Douglas & Collins, 1997).

In a study of 140 U.S. colleges, marijuana use was significantly higher among students who attended non-commuter colleges and colleges that reported having pubs on campus (Bell, R., Wechsler, H., Johnston, L., 1997). The same study concluded that marijuana use was more common among white students, single students and among students who spent more time at parties and socializing with friends (Bell, R., et. al., 1997). The more time students spent studying the less likey they were to use marijuana (Bell, R., et. al., 1997).

According to the National Household Survey on Drug Abuse for 1991-1993, the highest rates of marijuana use during the last 30 days were among college students who were not living with their parents (Gfoerer, J., et. al., 1997). Living with parents while in college was reported to be a protective factor against certain risk behaviors including marijuana use (Prendergast, M., 1994).

EHD and Marijuana Use among College Students in the United States

In a study using data from the CDC's 1995 NCHRBS, Jones and colleagues (2001) reported that students who engaged in EHD were significantly more likely to report concomitant

use of cigarettes, marijuana, cocaine and other drugs, compared to students who did not engage in EHD. Similarly, results from the HSPHCAS survey showed that more than 98% of marijuana users smoked cigarettes, engaged in EHD, and/or used other illicit drugs (Mohler-Kuo, M., et. al. 2003).

Mohler-Kuo et. al. (2003) calculated the odds ratio relationship between illicit substance use and EHD. When marijuana was utilized as the factor and EHD as the event, researchers found that students who were current marijuana users (operationalized as using marijuana during the past 30-days) were nearly seven times more likely to have engaged in EHD during the past two weeks than students who were not current marijuana users (Mohler-Kuo, M., et. al., 2003). One out of five current marijuana users in the study reported engaging in EHD during the past two weeks (Mohler-Kuo, M., et. al., 2003).

Jones et. al. (2001) reported that college students who engaged in EHD during the past 30 days were nine times more likely to have used marijuana during the same time period than students who did not engage in EHD during the past 30 days. Moreover, researchers noted that as the number of reported days of engaging in EHD increased, marijuana use likewise increased (Jones, S., et. al., 2001)

Shillington et. al. (2002) in their investigation of substance use problems by college students, reported that students who reported concomitant alcohol and marijuana use during the past 30 days (referred to as "poly-substance users") were more likely than students who used alcohol only during the past 30 days, to be younger and to experience 11 of the 15 alcohol and other drug (AOD) problems listed in the survey. The six most frequently identified problems among 30 day poly-substance users were hangover, riding in a car with an intoxicated driver,

getting sick and throwing up, missing class, passing out, and experiencing memory blackouts (Shillington, A., Clapp, J., 2001). All of the respondents in this investigation who reported using marijuana also reported using alcohol during the 30 days prior to the survey (Shillington, A., Clapp, J., 2001).

With regard to self-perception of problem behavior, students who reported past 30 day concomitant alcohol and marijuana use were eight times more likely to think that they had alcohol and other drug (AOD) related problems than non-concomitant and alcohol only users (Shillington, A., Clapp, J., 2001). Even after controlling for EHD, concomitant users were more likely to report AOD related problems than alcohol only users (Shillington, A., Clapp, J., 2001).

Purpose of the Study

Using data from the WKU-SHA 2002 survey, the purposes of this investigation were to: 1) determine the prevalence of alcohol use and EHD among undergraduate students at Western Kentucky University (WKU); 2) identify the most frequently reported consequences of alcohol use among undergraduate students at WKU; 3) determine the prevalence of marijuana and other illicit substance use among undergraduate students at WKU; 4) determine the prevalence of concomitant EHD and marijuana use among undergraduate at WKU; and 5) determine whether significant associations exist between WKU undergraduate students' characteristics (sex, race/ethnicity, age, relationship status, grade average, year in school, place of residence, and number of sex partners) and students' alcohol use, EHD, and marijuana use.

Research Questions

1. Alcohol use:
    a) What is the level of alcohol use (number of days used, number of hours used, number of drinks consumed and number of occasions drank) among WKU undergraduate students?
    b) What, if any, significant associations are reported in alcohol use based on WKU students' sex, age, race/ethnicity, relationship status, grade/average, year in school, place of residence, and number of sex partners?
2. Episodic Heavy Drinking:
    a) What are the levels of EHD (frequency and engagement) among WKU undergraduate students?
    b) What, if any, significant associations are reported in EHD (frequency and engagement) based on WKU students' sex, age, race/ethnicity, relationship status, grade average, year in school, place of residence, and number of sex partners?
3. Consequences of drinking:
    a) What are the most frequently identified problematic consequences of drinking alcohol among WKU undergraduate students?
    b) What, if any, significant associations are reported in problematic consequences of drinking alcohol based on WKU students' sex, age, race/ethnicity, relationship status, grade average, year in school, place of residence, and number of sex partners?

4. Illicit substance use:
    a) What are the levels of marijuana and other illicit substance use among WKU undergraduate students?
    b) What, if any, significant associations are reported in marijuana use and use of other illicit substances based on WKU students' sex, age, race/ethnicity, relationship status, grade average, year in school, place of residence, and number of sex partners?
5. Concomitant EHD and illicit substance use:
    a) Does a significant association exist between EHD (frequency) and marijuana use among WKU undergraduate students?
    b) Does a significant association exist between EHD (engagement) and marijuana use among WKU undergraduate students?

Hypotheses

1. Null Hypothesis (Ho_1): There are no significant differences in alcohol use among WKU undergraduate students based on students' sex, age, race/ethnicity, relationship status, grade average, year in school, place of residence or number of sex partners.
2. Null Hypothesis (Ho_2): There are no significant differences in EHD among WKU undergraduate students based on students' sex, age, race/ethnicity, relationship status, grade average, year in school, place of residence or number of sex partners.
3. Null Hypothesis (Ho_3): There are no significant differences in experiencing problematic consequences of drinking alcohol among WKU undergraduate students

based on students' sex, age, race/ethnicity, relationship status, grade average, year in school, place of residence or number of sex partners.

4. Null Hypothesis (Ho_4): There are no significant differences in marijuana and/or other illicit substance use among WKU undergraduate students based on students' sex, age, race/ethnicity, relationship status, grade average, year in school, place of residence or number of sex partners.
5. Null Hypothesis (Ho_5): A significant association does not exist between EHD (frequency) and marijuana use among WKU undergraduate students.
6. Null Hypothesis (Ho_6): A significant association does not exist between EHD (engagement) and marijuana use among WKU undergraduate students.

Methodology

Participants

Participants in the Western Kentucky University Student Health Assessment 2002 survey (WKU-SHA 2002) were undergraduate students enrolled during the Fall 2002 semester on WKU's main campus.

Eligibility (Inclusion)

Undergraduate students aged 18 years and older who were enrolled in any 100, 200, 300, and/or 400 level course on Western's main campus during the Fall 2002 semester were eligible for inclusion in this investigation. Graduate and post-baccalaureate students who were enrolled in any of these courses (mostly 400 levels) were excluded from initial analysis.

Data Collection

The WKU-SHA 2002 utilized a cross-sectional survey design. A random cluster sampling of classes from each course level (100, 200, 300, 400) was selected. In order to obtain a representative sample of undergraduate students enrolled at WKU during the Fall 2002 semester. The research team, led by the principal investigator, contacted the instructor of each randomly selected class. Instructors were informed of the purpose of the study, including the probable amount of class time (30 minutes) survey administration would take. Classes whose instructors agreed to participate in the study where visited by survey administrators from the research team at an agreed upon date and time. Survey administrators discussed the purpose of the study and reviewed the possible risks and benefits of participation with students in each selected class. Students were informed that the survey was completely anonymous, as no

personal identifying information was being collected, and that participation was voluntary. Thus, students could choose not to participate, skip any particular question on the survey or completely withdraw from participation even after initiation of the survey. Students who agreed to participate in the survey were asked to sign and date the consent form (see Appendix A) which was collected by the survey administrator. A copy of the consent form, the NCHA survey instrument, and a number two pencil were then given to these students. On average, students took approximately 30 minutes to complete the survey. Survey administration took place over several weeks during October and November 2002.

A total of 29 classes from the original list of 60 that were randomly selected (48.3%) participated in the WKU-SHA 2002. When all scheduled surveys were conducted, completed survey questionnaires were mailed to the ACHA in Baltimore, Maryland for data input. In April 2003, the principal investigator received WKU's raw survey data from ACHA as a compressed file on a floppy diskette. Hard copies of the executive summary of WKU's and the current reference group's (other institutions that participated in the NCHA during the same time period) results were also included.

During the summer of 2003, the raw data was transported into WKU's licensed statistical software called the Statistical Package for the Social Sciences (SPSS) and a data shell was created. During the summer and fall 2003 semesters, analyses of the WKU-SHA 2002 data were conducted.

Survey Instrument

The NCHA questionnaire used in this investigation was a paper and pencil survey instrument (see Appendix B), produced in a booklet format that can be scanned by a computer.

The eight-page instrument had 58 multiple-choice items designed to measure college students' health risk behaviors including those that contribute to: unintentional and intentional injury; tobacco use; alcohol and other drug use; sexual behaviors that contribute to unintended pregnancy and sexually transmitted infections including human immunodeficiency virus infection; unhealthy dietary behaviors; and physical inactivity. In addition, questions that asked students' age, race/ethnicity, sex, year in school, average letter grade, place of residence, relationship status, full-time or part-time status, number of work hours per week and number of volunteer hours per week were included.

The NCHA questionnaire contained items similar to those included in the CDC's NCHRBS. The NCHA's items were initially evaluated against those included in the NCHRBS to test for its reliability and validity. Other national studies with representative samples [Harvard School of Public Health's 1999 College Alcohol Study (CAS); the United States Department of Justice's National College Women Sexual Victimization Study 2000 (NCWSV), and the results from the pilot testing (1998, Spring and Fall of 1999)] were used to test for reliability and validity. Conducting such comparisons resulted in a more reliable and valid survey instrument used by the American College Health Association.

Study Population and Sample Description

There were 15,234 undergraduate students enrolled at WKU (including all extended campus sites) during the fall of 2002 (Western Kentucky University Office of Institutional Research, 2003). An exact headcount of undergraduate students who were exclusively taking classes on Western's main campus was not available.

During the fall of 2002, 24% (N=5,148) of undergraduate students at WKU were freshmen, 21% (N=3,125) were sophomores, 18% (N=2,074) were juniors, and 23% (N=3,444) were seniors. There were 6,266 (41%) male undergraduate students and 8,968 (59%) female undergraduate students at WKU during the fall of 2002.

Enrollment profiles by undergraduate students' race/ethnicity during the fall of 2002 at WKU were as follows: 13,409 (88%) were white, 1,277 (8.4%) were African Americans, and 548 (3.6%) were classified as other (denotes Asian/pacific islander, Hispanic, and native American/Alaskan natives). Forty-four percent (N=6,637) of WKU undergraduate students at WKU during the fall of 2002 were between the ages of 18 and 20 years while 55% (N=8,420) were aged 21 years or more.

Dependent Variables

The dependent variables assessed in this investigation included risk behaviors pertaining to alcohol consumption, binge or episodic heavy drinking (EHD), the consequences of drinking alcohol, illicit drug use including marijuana use, and concomitant EHD and marijuana use.

Alcohol consumption was measured using the following items from the WKU-SHA 2002:

1. Thirty day prevalence of alcohol consumption was measured by question 9d: *Within the last 30 days, on how many days did you use alcohol (beer, wine, liquor)?* Possible responses included: never used; have used but not in last 30 days; 1-2 days; 3-5 days; 6-9 days; 10-19 days; 20-29 days; and all 30 days *(categorical variable).* Answers to this question were recoded into two

categories: *zero days* and *one or more days*. Students who reported using alcohol but not in the last 30 days were excluded from the analysis.

2. Number of hours spent drinking alcohol came from question 12: *The last time you "partied"/socialized, how many hours did you drink alcohol?* Students could code or "bubble-in" their numeric responses (continuous variable). Answers to this question were recoded into two categories: *zero hours (no)* and *one or more hours (yes)*.
3. Number of drinks consumed was measured by question 13: *The last time you "partied"/socialized, how many alcoholic drinks did you have?* Students could code or "bubble-in" their numeric responses (continuous variable). Answers to this question were recoded into two categories: *zero drinks (no)* and *one or more drinks (yes)*.
4. Number of drinking occasions during the last two weeks was measured by question 14: *In the last two weeks, on how many occasions did you drink the same or more alcohol as indicated in #13?* Students could code or "bubble-in" their numeric responses (continuous variable). Answers to this question were recoded into two categories: *zero occasions (none)* and *one or more occasions*.

EHD was measured using the following questions from the survey questionnaire:

1. EHD (frequency) was measured by question 16: *Think back over the last two weeks. How many times, if any, have you had five or more alcoholic drinks at a sitting?* Possible responses included: none; 1 time; 2 times; 3 times; 4 times; 5 times; 6 times; 7 times; 8 times; 9 or more times *(categorical variable)*. Answers

to this question were recoded into two categories: *zero times* and *one or more times*.

2. EHD (engagement) the last time students "partied" was measured by question 13: *The last time you "partied"/socialized, how many alcoholic drinks did you have?* Students could code or "bubble-in" their numeric responses (continuous variable). Answers to these questions were recoded into a new variable that identified *episodic heavy drinkers (yes)* and *non-episodic heavy drinkers (no)* using gender specific measures for EHD. Four or more and five or more alcoholic drinks per drinking episode were used to identify female and male episodic heavy drinkers, respectively.

Consequences of drinking alcohol were measured in question 18, a matrix that listed seven possible occurrences a student may have experienced after consuming alcohol:

1. *If you drink alcohol, within the last 12 months, have you experienced any of the following as a consequence of your drinking?*
    a. *Physically injured yourself*
    b. *Physically injured another person*
    c. *Been involved in a fight*
    d. *Did something regretted*
    e. *Forgot where you were or what you did*
    f. *Had someone use force or threat of force to have sex with you*
    g. *Had unprotected sex*

    Possible answers for each were: not applicable/don't drink; no; or yes. Answers to each preceding item were recoded into two categories: *yes* or *no.* Students who

responded "not applicable/don't drink" were coded "missing" responses and subsequently excluded from analyses.

Illicit drug use was measured using questions 9e-9i:

1. *Within the last 30 days, on how many days did you use:*
    a. *Marijuana (pot, hash, hash oil)*
    b. *Cocaine (crack, rock, freebase)*
    c. *Amphetamines (diet pills, speed, meth, crank)*
    d. *Rohypnol (roofies), GHB or Liquid X (intentional use)*
    e. *Other drugs*

    Possible responses included: never used; have used but not in last 30 days; 1-2 days; 3-5 days; 6-9 days; 10-19 days; 20-29 days; and all 30 days *(categorical variable)*. Answers to each of these times were recoded into two categories: *never used* and *used one or more days.*

Independent Variables

The following demographic characteristics of WKU students were used as independent measures in this investigation: students' sex, age, race or ethnicity, relationship status, place of residence, grade average, and year in school. In addition, the number of sex partners reported among WKU students was utilized as an independent measure.

Respondents' sex was assessed in question 46: "*What is your sex?"* Answers were categorically identified as either *male* or *female.*

Age was assessed in question 45: *"How old are you?"* Age was recoded as *younger than 21* versus *21 years and older.*

Due to the low number of respondents who self-identified as African-American, Hispanic/Latino, Asian/Pacific Islander, American Indian/Alaskan Native and other, race/ethnicity was recoded into two categories: *white* and *other.*

Relationship status was measured using question 53: *"What is your current relationship status?"* Possible responses included: single; married/domestic partner; engaged/committed dating relationship; separated; divorced; and widowed. Answers to this question were recoded into two categories namely *single* versus *engaged/committed/married*. All other categories (separated, divorced, widowed) were coded as "missing" responses and were excluded from analyses.

Students' place of residence was measured in question 54: *"Where do you currently live?"* Possible responses included: campus residence hall; fraternity or sorority house; other university/college housing; off-campus housing; parent/guardian's home; other. Answers to this question were recoded and categorized into: *live with parent(s)/guardian(s); on-campus housing;* and *off-campus housing*. Due to the very few responses under the categories fraternity or sorority house, other university/college housing, and "other", these responses were coded as "missing" and were thus excluded from the analyses.

Students' grade average was measured in question 34*: "What is your approximate cumulative grade average?"* Possible answers to this question were: A; B; C; D/F; and N/A. Answers to this question were recoded and categorized into: A; B; C or below. Students who answered N/A were coded as "missing" and were thus excluded from the analyses.

Question 49: "Year in school:" was utilized to measure students' year level. Possible answers were: 1st year undergraduate; 2nd year undergraduate; 3rd year undergraduate; 4th year undergraduate; 5th year or more undergraduate; Graduate or professional; Adult special; and

other. Answers to this question were recoded and categorized into: 1st year; 2nd & 3rd year; 4th & 5th year. Students who answered *graduate or professional, adult special, and "other"* were coded as "missing" and were thus excluded from the analyses.

Question 20: *"Within the last 12 months, with how many partners, if any, have you had sex (oral, vaginal, or anal)?"* was utilized as an independent measure as well. Students could code or "bubble-in" their numeric responses (continuous variable). This variable was recoded into: *zero* versus *one* versus *two or more partners*.

Analyses

Statistical analyses were conducted using SPSS version 11. Descriptive univariate analyses were conducted with all independent variables to provide a demographic profile of the students who participated in the WKU-SHA 2002. Descriptive univariate analyses were also conducted with all dependent variables in order to assess level of alcohol use, EHD, marijuana use, other illicit drug use, and concomitant EHD and marijuana use among WKU undergraduate students.

Chi-square test of significance was utilized to explore associations between dependent and independent variables. All tests were considered significant at or below the .05 alpha level.

Results

Demographics

A total of 621 undergraduate students taking classes on Western's main campus completed the WKU-SHA survey (see Table 1). There were 188 (34%) male and 367 (66%) female undergraduate students who participated in the WKU-SHA 2002. Fifty-four percent (n=318) were aged between 18 and 20 years while 45% (n=263) were aged 21 years or more. The mean age of respondents was 21 years. Almost 29% (n=167) of respondents were 18 years of age. The youngest respondent was 16 years of age and the oldest was aged 73 years. Most respondents were white (91%; n=539) and nine percent (n= 55) were non-white (also operationalized as "other" and included African American, Hispanic and other non- white respondents). In terms of relationship status, 52% (n=302) of respondents were single, 48% (n=283) were either married, in a domestic partnership, engaged to be married, or in a committed dating relationship. The following respondents were excluded from analysis: separated (0.2%; n=1), divorced (1%; n=6) and widowed (0.5%; n=3). The percentage reported from these excluded categories were the percent of the total sample (n=621).

Forty-five percent (n=258) of respondents lived in a residence hall on campus, 42% (n=241) lived off campus, and 13% (n=71) lived with their parent(s) or their guardian(s). The following responses were excluded from the analysis and were not reported in table 1: fraternity or sorority housing (1.3%; n=8), other university housing (0.2%; n=1) and "other" (2.8%; n=17). The percentage reported from these excluded categories were the percent from the total sample (n=621).

Table 1
Demographic Characteristics of Respondents (n=621)

Characteristic	n	%[a]
Sex		
Male	188	33.9
Female	367	66.1
Age		
<21 years	318	54.7
21+ years	263	45.3
Race or Ethnicity		
White	539	90.7
Other	55	9.3
Relationship Status		
Single	302	51.6
Engaged/Married	283	48.0
Place of Residence		
Campus residence hall	258	45.3
Off campus	241	42.3
With parent(s)/guardian(s)	71	12.5
Grade average		
A	163	28.7
B	287	50.6
C/D/F	117	20.6
Year in school		
First Year	213	37.4
Second & Third Year	144	25.3
Fourth & Fifth Year	202	35.5
Number of Sex Partners (last 12 months)		
0 partners	135	22.7
1 partner	276	46.3
2+	185	31.0

[a] valid percent

With regard to self-reported cumulative grade average, 29% (n=163) of respondents said they had an "A", 51% (n=287) had a "B", and 21% (n=117) had either a "C", "D", or "F" grade average.

Thirty-seven percent (n=213) of the WKU respondents were first year, seven percent (n=42) were second year, 18% (n=103) were third year, 22.5% (n=129) were fourth year, and 12.9% (n=74) were fifth year undergraduates. There were four (0.7%) graduate or professional students, two (0.3%) adult special students and five who self-identified as "other" (0.9%).

Twenty-three percent (n=135) of respondents reported not having a sex partner during the last 12 months. Forty six percent (n=276) of students reported having one sex partner and 31% (n=185) reported having two or more sex partners during the last 12 months.

Alcohol Use

Seventy-three percent (n=365) of respondents reported that they used alcohol on one or more days during the last 30 days; 26.7% (n=133) said they never used alcohol in their lifetime. Students who reported using alcohol but not in the last 30 days were excluded from analysis and are not reported in Table 2. The last time students "partied", nearly 70% (n=418) reported spending one or more hours drinking alcohol. Thirty percent (n=181) reported that they did not drink alcohol the last time they "partied". Approximately 71% (n=424) of respondents reported that they consumed one or more alcoholic drinks the last time they "partied", 29% (n=175) did not drink the last time they "partied". With regard to two-week prevalence, 41% (n=246) of students reported consuming one or more alcoholic drinks, while 59% (n=350) did not drink (see Table 2).

Table 2
Frequency Distribution of Alcohol Consumption and EHD among Respondents (n=621)

Variables	n	% [a]
30 day prevalence		
Never	133	26.7
1+ Days	365	73.3
Number of hours drank (last time "partied")		
0 Hours	181	30.2
1+ Hours	418	69.8
Number of drinks (last time "partied")		
0 Drinks	175	29.2
1+ Drinks	424	70.8
Number of occasions drank (last 2 weeks)		
0 Occasions	350	58.7
1+ Occasions	246	41.3
EHD frequency		
0 times	21	3.4
1+ times	596	96.6
Engaged in EHD (last "party")		
Yes	283	45.9
No	334	54.1

[a] valid percent

Significant associations were reported between each of the aforementioned alcohol behaviors and characteristics of respondents (see Table 3). Specifically, students aged 21 years or more were significantly ($p<.05$) more likely than students aged less than 21 years to drink alcohol during the last 30 days, and to drink alcohol the last time they "partied" ($p<.05$).

"Single" students were significantly ($p<.05$) more likely to report drinking alcohol on one

or more occasions during the last two weeks than engaged/ married students.

Students who lived off campus were more likely to drink alcohol during the last 30 days ($p<.001$), to drink for one or more hours the last time they "partied" ($p<.001$), to drink alcohol the last time they "partied" ($p<.001$), and to report drinking alcohol during the last two weeks ($p<.001$) than students who lived on campus. Students who lived with their parent(s) or guardian(s) were least likely to report engaging in the aforementioned alcohol behaviors and consistently reported half the levels of alcohol consumption than students who lived off campus.

Respondents' grade average was also significantly associated with alcohol consumption behaviors. Specifically, students with a grade average of "C" or lower were more likely to drink alcohol during the last 30 days ($p<.01$), to drink for one or more hours the last time they "partied" ($p<.01$), to drink alcohol the last time they "partied" ($p<.01$), and to report drinking alcohol during the last two weeks ($p<.01$) than students with a "B" average. "A" students consistently reported the lowest levels of alcohol consumption in all of the aforementioned alcohol behaviors.

Students who had two or more sex partners during the last 12 months were more likely to drink alcohol during the last 30 days ($p<.001$), to drink for one or more hours the last time they "partied" ($p<.001$), to drink alcohol the last time they "partied" ($p<.001$), and to report drinking alcohol during the last two weeks ($p<.001$) than students who had only one sex partner during the last 12 months. Students who did not have any sex partners during the last 12 months reported the lowest levels of alcohol consumption.

From these findings, the first null hypothesis is not accepted since significant differences in alcohol use were reported based on respondents' characteristics (age, relationship status, place

Table 3

Bivariate Analysis of Students' Characteristics and Alcohol Consumption[a] *(n=621)*

	Alcohol Consumption							
	30 day Prevalence		1± hours last "party"		1± drinks last "party"		2 week Prevalence	
Characteristic	Never %	1± days %	No %	Yes %	No %	Yes %	None %	1± occasions %
Age								
<21 years	30.2	69.8	33.3	66.7	32.7	67.3	59.9	40.1
21± years	22.1	77.9	26.6	73.4	25.1	74.9	57.4	42.6
	p<.05		NS		p<.05		NS	
Relationship Status								
Single	25.7	74.3	28.7	71.3	28.9	71.1	54.2	45.8
Engaged/ Married	26.8	73.2	31.7	68.3	29.3	70.7	63.8	36.2
	NS		NS		NS		p<.05	
Place of Residence								
On-campus	28.7	71.3	33.7	66.3	32.9	67.1	61.1	38.9
Off campus	16.8	83.2	19.2	80.8	18.3	81.7	52.5	47.5
Parent(s)/ Guardian(s)	57.9	42.1	54.9	45.1	53.3	46.5	76.1	23.9
	p<.001		p<.001		p<.001		p<.001	
Grade Average								
A	36.7	46.5	38.3	61.7	37.0	63.0	69.1	30.9
B	25.4	74.6	28.7	71.3	28.3	71.7	56.5	43.5
C/D/F	16.5	83.5	23.5	76.5	21.7	78.3	50.0	50.0
	p<.01		p<.01		p<.01		p<.01	
Number of Sex Partners								
0	54.5	45.5	56.4	43.6	56.0	44.0	78.9	21.1
1	24.8	75.2	28.0	72.0	26.5	73.5	62.2	37.8
2±	11.4	88.6	15.1	84.9	14.6	85.4	39.1	60.9
	p<.001		p<.001		p<.001		p<.001	

[a] P-value is based on chi-square test statistic; NS= not statistically significant

of residence, grade average and number of sex partners). There were however no reported differences in alcohol use based on respondents' sex, race/ethnicity and year in school.

Episodic Heavy Drinking

Episodic heavy drinking (EHD) levels were measured by frequency (operationalized as consuming five or more drinks per drinking episode during the last two weeks), and by engagement (operationalized as consuming five or more alcoholic drinks for males and four or more alcoholic drinks females the last time students "partied"). Approximately 97% of respondents reported EHD behavior during the last two weeks and 46% reported the same behavior the last time they "partied" (Table 2).

Significant associations between EHD and respondents' characteristics were reported (see Table 4). In terms of race/ethnicity, white students were significantly more likely to report EHD during the last 2 weeks ($p<.05$) and the last time they "partied" ($p<.001$) than non-white students.

Students who lived off campus were significantly ($p<.001$) more likely to engage in EHD the last time they "partied" than students who lived on campus. Students who lived with their parent(s) or guardian(s) were least likely to engage in EHD the last time they "partied".

Students who had two or more sex partners during the last 12 months were significantly ($p<.001$) more likely to report engaging in EHD the last time they "partied" than students who had only one sex partner and students who did not have any sex partners during the last 12 months.

From these findings, the second null hypothesis is not accepted since significant

Table 4
Bivariate Analysis of Students' characteristics and EHD[a] (n=621)

	Episodic Heavy Drinking			
	EHD by Frequency (last 2 weeks)		EHD by Engagement (last "party)	
Characteristic[b]	0 times %	1+ times %	No %	Yes %
Race				
White	0.7	99.3	50.1	49.9
Other	3.6	96.4	76.4	23.6
	p<.05		p<.001	
Place of Residence				
On-campus	1.2	98.8	54.3	45.7
Off campus	0.8	99.2	42.3	57.7
Parent(s)/ Guardian(s)	1.4	98.6	81.7	18.3
	NS		p<.001	
Number of Sex Partners				
0	2.2	97.8	71.9	28.1
1	0.4	99.6	54.7	45.3
2+	1.0	98.9	37.3	62.7
	NS		p<.001	

[a] P-value is based on chi-square test statistic; NS= not statistically significant

differences in EHD were reported based on respondents' characteristics (race, place of residence, and number of sex partners). Respondents' sex, age, relationship status, grade average, and year in school were however not found to be significantly associated with EHD behaviors.

Table 5
Frequency Distribution of Self-Reported Consequences of Alcohol Consumption among Respondents (n=621)

Variables	(*n*)	%[a]
Did something regretted		
No	(272)	61.5
Yes	(170)	38.5
Experienced memory blackout		
No	(305)	68.8
Yes	(138)	31.2
Had unprotected sex		
No	(342)	77.7
Yes	(98)	22.3
Physically injured self		
No	(358)	81.0
Yes	(84)	19.0
Got in a fight		
No	(414)	93.7
Yes	(28)	6.3
Physically injured another person		
No	(416)	93.9
Yes	(27)	6.1
Forced/threatened to have sex		
No	(424)	95.9
Yes	(18)	4.1

[a] valid percent

Consequences of Alcohol Consumption

The most frequently identified problematic consequence of drinking alcohol (38.5%, n=170) among respondents was “doing something they regretted”. This was followed by

experiencing a memory blackout (31.2%; n=138), engaging in unprotected sex (22.3%; n=98) and physically injuring self (19%; n=84). Six percent (n=28) said they got into a fight, another six percent (n=27) said they physically injured another person, and four percent (n=18) reported either being threatened to have sex or were forced to have sex as a result of drinking alcohol (Table 5). Significant associations were reported between most of the problematic consequences of alcohol consumption and students' characteristics. Due to the low number of responses to three of the consequences (physically injured another person, got in a fight, and forced and/or threatened to have sex), these were not reported in Table 6.

Students aged 21 years or more were significantly ($p<.05$) more likely than students aged less than 21 years to engage in unprotected sex after drinking alcohol during the last 12 months.

In terms of race/ethnicity, white students were significantly ($p<.01$) more likely than non-white students to report doing something they regretted after drinking alcohol during the last 12 months.

"Single" students were significantly ($p<.01$) more likely to report doing something they regretted after drinking alcohol during the last 12 months than engaged/married students.

Students who lived off campus were significantly ($p<.01$) more likely to engage in unprotected sex after drinking alcohol during the last 12 months than students who lived with their parent(s) or guardian(s) or on campus.

Fourth and fifth year undergraduate students were significantly ($p<.01$) more likely to engage in unprotected sex after drinking alcohol during the last 12 months than second and third year undergraduate students. First year undergraduate students were least likely to engage in unprotected sex after drinking alcohol during the last 12 months.

Table 6
Bivariate Analyses of Students' Characteristics and Self-Reported Consequences of Alcohol Consumption[a] (n=621)

	Consequences of Alcohol Consumption							
	Physically injured self		Did something regretted		Experienced memory blackout		Had unprotected sex	
Characteristic	No %	Yes %	No %	Yes %	No %	Yes %	No %	Yes %
Age								
<21 years	81.3	18.7	61.6	38.4	69.0	31.0	84.7	15.3
21± years	80.1	19.9	62.4	37.6	70.1	29.9	69.8	30.2
	NS		NS		NS		p<.05	
Race								
White	80.3	19.8	60.0	40.0	68.0	32.0	77.6	22.4
Other	89.7	10.3	81.6	18.4	80.0	20.0	82.1	17.9
	NS		p<.01		NS		NS	
Relationship Status								
Single	78.8	21.2	54.5	45.5	65.3	34.7	75.1	24.9
Engaged/ Married	84.3	15.7	69.0	31.0	73.8	26.2	81.8	18.2
	NS		p<.01		NS		NS	
Residence								
On-campus	84.5	15.5	66.8	33.2	73.8	26.2	85.3	14.7
Off campus	77.0	23.0	56.3	43.7	65.8	34.2	71.1	28.9
Parent(s)/ Guardian(s)	90.9	9.1	63.6	36.4	70.6	29.4	84.8	15.2
	NS		NS		NS		p<.01	
Year in school								
1st	83.2	16.8	62.4	37.6	71.8	28.2	85.1	14.9
2nd & 3rd	81.1	18.9	56.6	43.4	71.7	28.3	79.0	21.0
4th & 5th	78.1	21.9	63.0	37	66.5	33.5	70.8	29.2
	NS		NS		NS		p<.05	
Number of Sex Partners								
0	79.4	20.6	66.7	33.3	79.4	20.6	96.8	3.2
1	91.5	8.5	75.8	24.2	74.9	25.1	88.6	11.4
2±	68.7	31.3	41.1	58.9	57.3	42.7	56.4	43.6
	p<.001		p<.001		p<.001		p<.001	

[a] P-value is based on chi-square test statistic; NS= not statistically significant

Students who had two or more sex partners during the last 12 months were significantly more likely to have done something they later regretted ($p<.001$), to experience a memory blackout ($p<.001$), and to have engaged in unprotected sex ($p<.001$) after drinking alcohol during the last 12 months than students who had one sex partner during the last 12 months. Students who did not have any sex partners during the last 12 months were least likely to experience the aforementioned consequences but were more likely ($p<.001$) to physically injure themselves after drinking alcohol during the last 12 months than students who had one sex partner. Students who had two or more sex partners were most likely ($p<.001$) to physically injure themselves after drinking alcohol during the last 12 months than students who had one or no sex partner during the last 12 months. It should be noted that two (3.2%) respondents who reported not having any sex partners during the last 12 months at the same time reported having unprotected sex as a result of drinking alcohol. Since these variables came from two separate questions, these respondents may have misinterpreted either or both of these two questions and therefore provided non-equivalent answers to both.

From these findings, the third null hypothesis is not accepted since significant differences in experiencing problematic consequences of drinking alcohol were reported based on respondents' characteristics (age, race, relationship status, residence, year in school, and number of sex partners). Respondents' sex and grade average were however not found to be associated with problematic consequences of alcohol consumption.

Marijuana and other Illicit Substance Use

Marijuana was the most frequently identified illicit substance that was used among the

Table 7
Frequency Distribution of Marijuana and Illicit Substance Use Among Respondents (n=621)

Variables (30 day prevalence)	n	%[a]
Marijuana		
Never	394	80.4
1± days	96	19.6
Amphetamines		
Never	513	91.9
1± days	45	8.1
Other Drugs		
Never	500	95.6
1± days	23	4.4
Cocaine		
Never	555	97.2
1± days	16	2.8
Rohypnol		
Never	579	98.8
1± days	7	1.2

[a] valid percent

respondents during the last 30 days (19.6%; n=96). This was followed by amphetamines, reported by eight percent of the respondents (n=45), "other drugs" (4.4%; n=23), and cocaine (2.8%; n=16). Rohypnol was the least used illicit substance (1.2%; n=7) among respondents (see Table 7).

Significant associations were reported between illicit substance use and students' characteristics. However, due to the low number of responses to three of these illicit substances (other drugs, cocaine, and rohypnol), although initially included in the analysis, these were not

reported in Table 8.

Male students were significantly ($p<.05$) more likely to report marijuana use during the last 30 days than females respondents.

Students who lived off campus were significantly ($p<.01$) more likely to report marijuana during the last 30 days than students who lived on campus. Students who lived with their parent(s) or guardian(s) were least likely to use marijuana during the last 30 days.

The higher the students' grade average; the least likely they were to report marijuana use. Students with a "C" or lower grade average were significantly ($p<.01$) more likely to report using marijuana during the last 30 days than students with higher grade averages.

Students who had two or more sex partners during the last 12 months were significantly more likely to have used marijuana ($p<.001$) and amphetamines ($p<.001$) during the last 30 days than students who had one or no sex partners.

From these findings, the fourth null hypothesis is not accepted since significant differences in marijuana and/or other illicit substance use were reported based on respondents' characteristics (sex, place of residence, grade average and number of sex partners). Respondents' age, race/ethnicity, relationship status and year in school were however not found to be significantly associated with marijuana and other illicit substance use.

Concomitant Engaging in EHD and Marijuana Use

Fourteen percent of students (n=76) reported both engaging in EHD (last "party") and using marijuana (last 30 days). Twenty five percent (n=138) of students engaged in EHD the last

Table 8
Bivariate Analysis of Students' Characteristics and Illicit Substance Use[a] *(n=621)*

	Illicit Substances			
	Marijuana use (30 day prevalence)		Amphetamine Use (30 day prevalence)	
Characteristic	Never %	1+ days %	Never %	1+ days %
Sex				
Male	74.7	25.3	92.0	8.0
Female	84.4	16.0	92.9	7.1
	p<.05		NS	
Residence				
On-campus	82.3	17.7	94.3	5.7
Off campus	72.8	27.2	90.2	9.8
Parent(s)/ Guardian(s)	92.2	7.8	92.4	7.6
	p<.01		NS	
Grade				
A	86.3	13.7	94.8	5.2
B	81.6	18.4	91.0	9.0
C/D/F	67.0	33.0	89.3	10.7
	p<.01		NS	
Number of Sex Partners				
0	94.9	5.1	99.2	0.8
1	86.8	13.2	94.9	5.1
2+	57.9	42.1	81.0	19.0
	p<.001		p<.001	

[a] P-value is based on chi-square test statistic; NS= not statistically significant

time they "partied" but did not use marijuana during the last 30 days. About four percent used marijuana during the last 30 days but did not engage in EHD the last time they "partied".

Table 9
Frequency Distribution of Concomitant EHD (engagement) and Marijuana Use among Respondents (n=559)

Measures	(*n*)	% [a]
Engaged in EHD last "party" and used marijuana during last 30 days		
No	(472)	86.1
Yes	(76)	13.9
Engaged in EHD last "party" but did not use marijuana during last 30 days		
No	(410)	74.8
Yes	(138)	25.2
Used marijuana during last 30 days but did not engage in EHD last "party"		
No	(539)	96.4
Yes	(20)	3.6
Neither engaged in EHD last "party" nor used marijuana during last 30 days		
No	(303)	54.2
Yes	(256)	45.8

[a] valid percent

Over 45% of respondents did not engage in either of the aforementioned behaviors (Table 9).

A highly significant association ($p<.001$) was reported between EHD (last "party") and marijuana use but none between EHD (last two weeks) and marijuana use among respondents. Specifically, respondents who engaged in EHD the last time they "partied" were significantly more likely to report 30 day marijuana use than respondents who did not engage in EHD the last time they "partied" (Table 10).

Table 10
Association between EHD and 30 Day Marijuana Use[a] *(n=490)*

	Episodic Heavy Drinking (last 2 weeks)			Episodic Heavy Drinking (last "party")		
Marijuana Use (last 30 days)	No %	Yes %	Total %	No %	Yes %	Total %
No	0.5	99.5	100	65.0	35.0	100
Yes	2.1	97.9	100	20.8	79.2	100
		NS			p<.001	

[a] P-value is based on chi-square test statistic; NS not statistically significant

With these findings, the fifth null hypothesis is accepted since a significant association between EHD (by frequency/last 2 weeks) and 30-day marijuana use was not reported. The sixth null hypothesis is however not accepted since a significant association between EHD (by engagement/last "party") and 30-day marijuana use was reported.

Discussion

Alcohol Use

The 30-day prevalence rate of alcohol use among respondents in this investigation was consistent with data reported among college students nationally. Seventy-three percent (73%) of WKU undergraduate students reported consuming alcohol on one or more days during the last 30 days while 70% of college students nationally reported this behavior (ACHA, 2003; Windle, M., 2003).

Most of the significant associations reported between 30-day prevalence of alcohol use and WKU students' age, relationship status, place of residence, grade average and number of sex partners were consistent with previous research. However, with regard to age, slightly different results were reported in this investigation. For example, the literature has consistently suggested that older students tend to have lower levels of alcohol consumption (Wechsler, H., Fulop, M.,1997). However, the findings in this investigation reported that students aged 21 years or more were more likely to report consuming alcohol during the last 30 days (77.9%) and to drink alcohol the last time they "partied" (74.9%) than students aged less than 21 years (69.8% and 67.3%, respectively). These findings do not necessarily mean that older students at WKU tend to drink more than older students nationally. Rather, the way in which age was categorized in this investigation was different than other studies. Specifically, older students in other investigations are typically defined as students aged 25 years or more. In this investigation, because only undergraduate students were studied, older students were defined as being aged 21 years or more. It is important to note that although the legal drinking age in Kentucky is 21 years, 70% of WKU students who were below the legal drinking age reported consuming alcohol during the

last 30 days and 67% consumed alcohol the last time they "partied".

Another result that was consistent with national data was the higher prevalence of alcohol use during the last two weeks among "single" students at WKU compared to students who were engaged, in a committed dating relationship or married. Previous research has demostrated that being "single" is a predictor of several risk behaviors among college students, including lifetime and current alcohol use (Wechsler, H & Fulop, M., 1997; Bell, R., et. al., 1997). It has also been demonstrated that being married can be a protective factor among college students against a number of risk behaviors including excessive alcohol use.

The association between alcohol consumption and respondents' place of residence was likewise consistent with current literature on college drinking (Gfroerer, J., et. al., 1997). Living with parents while in college is often a protective factor against substance abuse including excessive alcohol consumption while the opposite is true among students who do not live with their parents. Among WKU respondents, students who lived with their parent(s) or guardian(s) consistently had the lowest rates of alcohol consumption as measured by different alcohol behaviors. Students who lived off campus were consistently most likely to report the highest levels of alcohol consumption in all measures; followed by students who lived on campus.

Previous studies have suggested that excessive alcohol consumption among college students can disrupt school-related responsibilities, which in turn may result in poorer academic performance (Windle, M., 2003). In particular, students' grade point average (GPA), which is often used as a gauge for academic performance, has been shown to be associated with level of alcohol consumption. Specifically, the higher the level of alcohol consumption among college students, the lower their GPA (Prendergast, M., 1994). Similar findings were reported among

WKU undergraduate students in this investigation. Respondents who reported a grade average of "C" or lower were more likely to report higher levels of alcohol consumption, than students with a grade average of "B" or higher.

Higher levels of alcohol consumption were also reported among WKU respondents who had two or more sex partners compared to respondents who only had one sex partner or did not report any sex partners during the last 12 months. Again, these findings were consistent with trends among college students nationally. A study that utilized the NCHRBS' study sample showed that college students who had multiple partners (operationalized as having two or more sex partners in their lifetime) reported higher levels of alcohol consumption (Ogletree, R. et. al., 2001).

Episodic Heavy Drinking

Two-week prevalence of episodic heavy drinking among WKU respondents was more than twice the level reported in a study by Windle (2003) utilizing 2002's Monitoring the Future Survey (MFS) data. Using equivalent measures, WKU students reported a 97% two-week EHD prevalence rate whereas nationally college students reported only 40% (Windle, M., 2003). However, when taking gender-specific measures of EHD into consideration, the last time students "partied", 46% of WKU students reported this behavior. Although slightly higher, this figure is more consistent with rates reported among college students nationally. As mentioned earlier, it is estimated that between 41% and 44% of college students nationally engage in this behavior (Wechsler, H., et. al, 2002; Jones, S., et. al., 2001).

Significant associations were reported between EHD and students' race/ethnicity, place

of residence, and number of sex partners. Consistent with previous research, white respondents at WKU were more likely to engage in EHD during the last two weeks and the last time they "partied" than non-white respondents. Studies have suggested that African American, Asian American and Hispanic college students are less likely than Caucasian college students to engage in EHD (Douglas & Collins, 1997; Clapp & Segars, 2002; Windle, M., 2003). In this investigation, non-white or "other" students included African American (70%), Hispanic (15%), Asian (10%), Native American (2%), and "other" (3%) WKU undergraduate students.

Although a significant association was not reported between students' living arrangements and EHD during the last two weeks, EHD the last time students "partied" was significantly associated with this particular student characteristic. In accordance with the literature, living with parents while in college can be a protective factor against EHD (Gfroerer, J., et. al, 1997). This was shown to be true among WKU undergraduate students as students living off or on campus were more likely to engage in this behavior than students who lived with their parent(s) or guardian(s). In fact, WKU students who lived with their parent(s) or guardian(s) reported half the levels of EHD the last time they "partied" than students with other living arrangements.

Students with multiple sex partners (operationalized as having two or more sex partners during their lifetime) have been demonstrated in the literature to engage in EHD more frequently than those students who only had one or no sex partners during their lifetime (Ogletree, R., et. al, 2001). The same was true among WKU students in this investigation as they reported similar trends with college students nationally. WKU students with two or more sex partners during the last 12 months reported significantly higher rates of EHD the last time they "partied" (63%) than

students with one (45%) or no sex partners (28%).

Consequences of Alcohol Consumption

A plurality of WKU undergraduate students who drank alcohol reported doing something they regretted as a consequence of their drinking. However, a disturbing percent of WKU students reported experiencing a memory blackout, engaging in unprotected sex, and/or physically injuring themselves as a consequence of their alcohol consumption. Fewer WKU students reported getting into a fight, injuring another person, and being threatened and/or forced to have sex as consequences of their drinking. These consequences reported among WKU students were notably similar to those reported by undergraduate students in other investigations (Helmkamp, J., et. al, 2003; Prendergrast, M., 1994). Although not necessarily in the same order as in previous studies, the consequences of alcohol consumption among WKU undergraduate students are similar to those reported 10 years ago.

Engaging in unprotected sex as a result of drinking alcohol was found to be associated with WKU undergraduate students' age. Students who were aged 21 years or more were more likely to engage in unprotected sex after drinking than students under the age of 21 years. This could possibly be explained by the levels of alcohol use among respondents aged 21 years or more which were consistently higher than those reported among younger respondents. Another possible explanation may be associated with students' relationship status, as older students were less likely to be "single" than younger students and thus more likely to have unprotected sex with their partners than a stranger. Further investigation would need to be conducted to determine the reasoning behind this phenomenon.

"Single" respondents were more likely to report doing something they regretted as a result of drinking alcohol than engaged/in committed dating relationship and married respondents. Consistent with findings from previous studies, being "single" may predict some risk behaviors among college students compared to those who were married or were in a committed relationship (Wechsler, H & Fulop, M., 1997; Bell, R., et. al., 1997). It should however be noted that "single" respondents were found to have higher alcohol consumption level in only one of the measurements (two-week prevalence) than engaged/ in committed dating relationship and married respondents. Thus, there may be other factors influencing why "single" respondents experience this consequence than others.

Consistent with their lower levels of alcohol use and EHD, non-white WKU respondents were also less likely to report doing something they regretted as a consequence of drinking alcohol than white students. The literature has always identified being white as a predictor of substance use, including excessive alcohol use, among college students (Douglas, K., Collins, J., 1997; Clapp, J., et. al., 2000). Thus it is not surprising that white students at WKU reported more negative consequences of drinking alcohol than non-white students as a result of their higher levels of alcohol consumption and EHD.

Students who lived off campus were more likely to report having unprotected sex as a consequence of drinking than students who lived on campus or with their parent(s) or guardian(s). This is again consistent with the literature in which living arrangements in college can predict risk behaviors among students (Gfroerer, J., et. al.,1997). WKU respondents who lived off campus reported the highest levels of alcohol consumption and EHD than students with different living arrangements. Thus participation in these risk behaviors also increased the likelihood that they

would also experience negative consequences as result of their drinking. However, it is important to note that students who lived off campus were also more likely to be in a committed relationship than students who lived on campus or with their parent(s) or guardian(s). Thus they may be more likely to engage in unprotected sex with their partners

Fourth and fifth year undergraduate students were more likely to report having unprotected sex as a consequence of drinking alcohol than first, second, or third year students. It should be noted that fourth and fifth year undergraduate students were more likely to be older, to be in a committed relationship and to live off-campus – all factors demonstrated to be associated with having unprotected sex. Again, these students may be having intercourse with their partners. This study however did not investigate with whom students had unprotected sex. Additional research would need to be conducted to determine this phenomenon.

One disturbing finding from this investigation was the highly significant association between number of sex partners and having unprotected sex as a consequence of drinking alcohol among WKU respondents. Studies have consistently shown that having two or more current sex partners or having multiple lifetime sex partners is a predictor of other risk behaviors among college students (Ogletree, R., et. al., 2001). In this investigation, nearly 44% of respondents who had two or more sex partners during the last 12 months reported having unprotected sex after drinking alcohol compared to 11% of respondents with one sex partner and 3% of respondents with no sex partners during the last year.. This finding clearly demonstrates that strong association between alcohol consumption and risky sexual behaviors. It is therefore imperative that this association be addressed in college health promotion programs.

Marijuana Use

One out of five WKU respondents said they used marijuana during the last 30 days. This finding is consistent with national data in which 17% to 21% of college students nationally reported using marijuana during the last 30 days (CDC,1997; ACHA, 2003; Mohler-Kuo, M., et. al., 2003). Additionally, WKU respondents were similar to their counterparts at other colleges and universities in identfying marijuana as their most frequently used illicit substance (Bennet, M., et. al., 1999).

The significant association between WKU students' sex and marijuana use was consistent with previous studies as well. WKU male students were more likely to report marijuana use during the last 30 days than their female counterparts. Research has shown that male college students were indeed more likely to report 30-day marijuana use than female college students (Douglas, K., Collins, J., 1997).

Previous studies have shown that living with parents while in college is a protective factor against marijuana use (Prendergast, 1994) while living off-campus is a predictor of marijuana use among college students (Gfroerer, J., et. al., 1997). This was true among WKU respondents, as students who lived off campus were most likely to report using marijuana and students who lived with their parent(s) or guardian(s) were least likely to use marijuana during the last 30 days.

A significant association was reported between WKU students grade average and 30-day marijuana use. Specifically, the higher students' grade average, the least likely they were to report using marijuana during the last 30 days. Again, this was consistent with national trends as college students who used marijuana tended to have lower GPAs than non-marijuana users.

WKU respondents who had two or more sex partners during the last 12 months were significantly more likely to use marijuana during the last 30 days (42%) than students who had only one sex partner (13%) or no sex partner at all (5%). This was consistent with previous studies including the NCHRBS where college students who had multiple sex partners were almost five times more likely to use illicit substances including marijuana than students who had only one or no sex partner (Ogletree, R., et. al., 2001).

Association between EHD and Marijuana Use

Unlike previous research, there was no association reported between engaging in EHD during the last two weeks and marijuana use among WKU undergraduate students. A possible explanation for this was the way in which EHD was operationalized. In this investigation, EHD (frequency) was defined as consuming five or more alcoholic drinks during the last two weeks. Perhaps this did not really capture the behavior it was intended to measure. This was because previous research has shown that a different measure for EHD in males (five or more alcoholic drinks per episode) and females (four or more alcoholic drinks per episode) was a more accurate measure of this behavior (Wechsler H., et. al., 1995). In this investigation, measuring EHD by frequency specifically left out some female episodic heavy drinkers and therefore may have failed to accurately measure the prevalence of this behavior among the respondents.

However, with regard to EHD the last time students "partied" and marijuana use, a significant association was reported. Specifically, WKU respondents who engaged in EHD the last time they "partied" were significantly more likely to have used marijuana during the last 30 days than students who did not engage in EHD the last time they "partied". This was consistent

with previous research of college students. Although previous research has demonstrated a dose-response relationship between amount of alcohol consumed and level of marijuana use, this relationship was not examined in this investigation (Jones, S., et. al., 2001). Thus, while EHD may predict marijuana use among WKU undergraduate students, this conclusion cannot be drawn at this point in time.

Limitations

This investigation excluded WKU graduate students and undergraduate students attending classes on other WKU campuses. Because of this, undergraduate students with different characteristics and/or behaviors from those taking classes on WKU's main campus may not have been included in this investigation.

Nearly half of classes randomly selected to participate in this study were excluded from this investigation because their instructors refused to participate. Thus, the external validity of the results reported in this investigation may be challenged as students in classes who participated in the survey may have been different from those who did not participate.

The literature suggests that students who engage in high-risk behaviors also have problems with class attendance and other academic responsibilities (Windle, M., 2003). Thus, it is possible that these students were not included in this investigation and the prevalence of some risk behaviors was not captured. However, because most of the results reported in this investigation were consistent with the literature, the likelihood that this occurred is remote.

Finally, these results were reported by students who opted to participate in this investigation. Thus, it is possible that the health risk behaviors reported among these students

may have been different from those who did not participate. In addition, research has shown that college students like the idea of being perceived as risk takers by the general public (Lederman, L., et. al., 2003). As a result, it is possible that some students exaggerated the extent to which they engaged in risk behaviors in order to fit the "risk-taker" label. However, because risk behaviors reported among WKU students were similar to those among college students nationally, it is unlikely that this occurred.

Future Studies

It is important to reiterate that this study did not examine the dose-response relationship between EHD and marijuana use among WKU students. Thus in order to determine the extent to which these two variables are associated, additional research controlling for confounding variables would need to be conducted.

Further studies should be done to develop a uniform and standard measurement of EHD among college students. Current literature has at least four different definitions of this behavior. Tests of validity and reliability on this measurement should also be considered as these are crucial whether the nature of the behavior is captured as close as possible to true phenomena. Dose-response relationship between number of alcoholic drinks and when alcohol impairment sets in should likewise be further explored to strengthen the supposition that EHD is indeed a risky behavior which causes serious detrimental effects among college students.

Finally, further investigation on the long-term consequences of EHD and marijuana use among WKU students should be conducted through a longitudinal study. This could show the extent to which these current risk behaviors impact upon their lives in the future. If indeed these

risk-taking behaviors have a negative impact on college students in the long run, a stronger sense of urgency regarding health promotion programs and services on college campuses may be realized.

Conclusions and Recommendations

Perhaps the most significant implication of this investigation is that WKU students engage in the same risk behaviors as their counterparts at other colleges and universities across the country, particularly with regard to alcohol use, EHD, marijuana use, and concomitant EHD and marijuana use. This investigation demonstrated that the prevalence of these risk behaviors among WKU undergraduate students were consistent with those of college students nationally. This means that WKU has similar problem behaviors and health risks that need to be addressed through programs and services as other colleges and universities.

In particular, health programs and services should address underage drinking; engaging in EHD the last time students "partied" which can lead to undesired consequences including unprotected sex and having multiple sex partners; marijuana use; and concomitant EHD and marijuana use. These risky behaviors should especially be addressed among WKU students who are "single", male, white, live off campus, have a GPA of "C" or lower, and have multiple sex partners. These characteristics among WKU students had strong associations with the aforementioned risk behaviors

A continuous and consistent health promotion program that specifically deals with college drinking should be institutionalized at WKU through the University's health services unit. Activities and strategies addressing EHD and marijuana use should be provided throughout

the school year and should be part of a single health promotion program geared toward the aforementioned WKU students.

First, when designing health promotion programs that address college drinking, health planners should remember to incorporate both educational and environmental strategies that address illicit substance use and risky sexual behaviors. In addition, enacting institutional regulations that require stiffer penalties against alcohol and illicit substance use may need to be considered. Whatever approach and/or program design is undertaken, it should be appropriate for students most likely to engage in these risk behaviors.

Finally, it is imperative that the target population is actively involved in program planning, program implementation, and program evaluation. Health promotion programs particularly those that deal with college drinking are more likely to be successful if the target population is directly involved in all of its phases (Minto, S., et. al., 2002).

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Appendix A

Informed Consent Form

WKU STUDENT HEALTH ASSESSMENT (HS02-117)
INFORMED CONSENT FORM

Principal Investigator: Dr. Lisa L. Lindley
Department of Public Health, STH 408C
745-5870

Introduction:
You are being asked to participate in a research project conducted through Western Kentucky University. The University requires that you give your signed agreement to participate in this project.

An investigator assisting with this project will explain to you in detail the purpose of the project, the procedures to be used, and the potential benefits and possible risks of participation. You may ask him/her any questions that will help you understand the project. A basic explanation of the project is written below. Please read this explanation and discuss with the investigator any questions you may have.

If you decide to participate in the project, please sign on the back of this form in the presence of the person who explained the project to you. You should be given a copy of this form to keep.

Purpose of this project:
The University is an important setting in which to provide health-related programs and services to students. In order to provide the most appropriate services on campus, it is vital that providers become aware of the relevant health issues and concerns of students at their institution. The purpose of this investigation is to assess the current health-related behaviors and issues of undergraduate students currently enrolled at Western Kentucky University. It is anticipated that the results from this investigation will be used to develop new and/or update existing health-related programs and services on campus. Your participation in this process is very much appreciated!

Explanation of procedures:
If you agree to participate in this study, an investigator assisting on this project will give you a copy of the *National College Health Assessment* survey to complete. Within the survey, you will be asked about a variety of health-related behaviors, including behaviors that contribute to unintentional and intentional injury; tobacco use; alcohol and other drug use; sexual behaviors; dietary behaviors; and physical activity. In addition, you will be asked to provide information about yourself, including your age, sex, race/ethnicity, year in school, place of residence, etc.

In order to ensure anonymity, you will **NOT** be asked anything that will identify you to the researchers, including your name, address, or any other identifying information. Please do **NOT** put your name anywhere on the survey.

After you complete the survey, please place it in the envelope provided by the investigator. The investigator assisting with this research will be responsible for returning all of the completed surveys from your class to the principal investigator. Your class' surveys will be added to those completed by other classes on campus. All completed surveys will be mailed to the American College Health Association in Baltimore, Maryland where they will be scanned by a computer. The scanned data will be saved on a computer disk and mailed to the principal investigator at WKU. From there, the principal investigator will analyze the data and report the results.

Discomfort and risks:
Certainly, some of the behaviors and issues upon which you will be reporting in the survey may conjure up a variety of emotions for you. Please know that this is quite normal. However, if you find it too difficult to answer any of the questions posed in this survey, please feel free to not answer them (leave them blank) or discontinue participation in the survey at any time.

Benefits:
There are several benefits to participation in this project. Certainly, your contribution to this investigation will provide valuable and much needed information about the health-related behaviors of undergraduate students at Western Kentucky University. In addition, it is anticipated that the results from this investigation will be used to develop new and/or enhance existing health programs and services provided to students on campus. Basically, your participation in this project has the potential to benefit yourself and many other Western students in the future.

Confidentiality:
As previously mentioned, you will **NOT** be asked to provide any personal identification information (such as name, address, etc.) in the survey. Thus, the investigators will not be able to link you to your completed survey. In addition, only the investigators on this project will have access to the data collected from this investigation; other students, your instructor nor anyone else will have access to the surveys or the data file.

Refusal/Withdrawal:
Refusal to participate in this study will have no effect on any future services to which you may be entitled from the University. Anyone who agrees to participate in this study is free to withdraw from the study at any time without penalty.

IMPORTANT NOTE: If you have already completed this survey in another class, the investigators respectfully request that you NOT participate again. Participation on multiple occasions by the same individuals will cause the results to be less valid. Please notify the investigator if you have already participated in this survey.

I understand that it is not possible to identify all potential risks in an experimental procedure, and I believe that reasonable safeguards have been taken to minimize both the known and potential but unknown risks.

_____ _____
Signature of Participant Date

_____ _____
Witness Date

THE DATED APPROVAL (7/17/02) OF THIS CONSENT FORM INDICATES THAT THIS PROJECT HAS BEEN REVIEWED AND APPROVED BY THE WESTERN KENTUCKY UNIVERSITY HUMAN SUBJECTS REVIEW BOARD
Dr. Phillip E. Myers, Human Protections Administrator
TELEPHONE: (270) 745-4652

Appendix B

National College Health Assessment

American College Health Association

National College Health Assessment

Instructions:

The following questions ask about various aspects of your health.

To answer the questions, fill in the oval that corresponds to your response.

Select only one response unless instructed otherwise.

Make heavy black marks with a #2 pencil that fills the ovals completely.

Erase cleanly any answer that you wish to change.

This survey is completely voluntary. You may choose not to participate or not to answer any specific question. You may skip any question you are not comfortable in answering.

This survey is completely anonymous. Please make no marks of any kind on the survey which could identify you individually.

Composite data will then be shared with your campus for use in health promotion activities.

Thank you for taking the time and thought to complete this survey. We appreciate your participation!

PAGE ONE

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The first 8 questions ask about health, health education, and safety.

1. **Considering your age, how would you describe your general health?**
   ○ Excellent ○ Very good ○ Good ○ Fair ○ Poor ○ Don't know

2. **On which of the following health topics have you ever received information from your college or university? (Select all that apply)**
   - ○ Tobacco use prevention
   - ○ Alcohol and other drug use prevention
   - ○ Sexual assault/relationship violence prevention
   - ○ Violence prevention
   - ○ Injury prevention and safety
   - ○ Suicide prevention
   - ○ Pregnancy prevention
   - ○ AIDS or HIV infection prevention
   - ○ Sexually transmitted disease (STD) prevention
   - ○ Dietary behaviors and nutrition
   - ○ Physical activity and fitness
   - ○ None of the above

(Please mark the best response for each question to the right)	3. Use the scale below to record the BELIEVABILITY of each source of health information. Believable		Neither Believable nor Unbelievable	Unbelievable	4. Do you usually get health-related information from any of the following sources? No	Yes
Leaflets, pamphlets, flyers	○	○	○		○	○
Campus newspaper articles	○	○	○		○	○
Health center medical staff	○	○	○		○	○
Health educators	○	○	○		○	○
Friends	○	○	○		○	○
Resident assistants/advisors	○	○	○		○	○
Parents	○	○	○		○	○
Religious center	○	○	○		○	○
Television	○	○	○		○	○
Magazines	○	○	○		○	○
Campus peer educators	○	○	○		○	○
Faculty/coursework	○	○	○		○	○
Internet/world wide web	○	○	○		○	○
Other: (please specify) _____	○	○	○		○	○

5. Within the **last 12 months**, how often did you: (Please mark the appropriate column for each row)	Always	Most of the time	Sometimes	Rarely	Never	N/A didn't do this within the last 12 months
a. Wear a seatbelt when you rode in a car?	○	○	○	○	○	○
b. Wear a helmet when you rode a bicycle?	○	○	○	○	○	○
c. Wear a helmet when you rode a motorcycle?	○	○	○	○	○	○
d. Wear a helmet when you were inline skating?	○	○	○	○	○	○

6. Within the **last 12 months**, were you:	Yes	No
In a physical fight?	○	○
Physically assaulted (do not include sexual assault)?	○	○

	Yes	No
7. Within the last 12 months, have you experienced:		
Verbal threats for sex against your will?	○	○
Sexual touching against your will?	○	○
Attempted sexual penetration (vaginal, anal, oral intercourse) against your will?	○	○
Sexual penetration (vaginal, anal, oral intercourse) against your will?	○	○
8. Within the last 12 months, have you been in a relationship that was:		
Emotionally abusive?	○	○
Physically abusive?	○	○
Sexually abusive?	○	○

The next 11 questions ask about alcohol, tobacco, and drugs.

9. Within the last 30 days, on how many days did you use: (Mark one for each row)	1-2 days	3-5 days	6-9 days	10-19 days	20-29 days	All 30 days	Have used, but not in last 30 days	Never used
Cigarettes	○	○	○	○	○	○	○	○
Cigars	○	○	○	○	○	○	○	○
Smokeless tobacco	○	○	○	○	○	○	○	○
Alcohol (beer, wine, liquor)	○	○	○	○	○	○	○	○
Marijuana (pot, hash, hash oil)	○	○	○	○	○	○	○	○
Cocaine (crack, rock, freebase)	○	○	○	○	○	○	○	○
Amphetamines (diet pills, speed, meth, crank)	○	○	○	○	○	○	○	○
Rohypnol (roofies), GHB or Liquid X (intentional use)	○	○	○	○	○	○	○	○
Other drugs	○	○	○	○	○	○	○	○

10. Within the last 30 days, how often do you think the typical student at your school used: State your best estimate. (Mark one for each row)	Used daily	One or more days	Never used
Cigarettes	○	○	○
Cigars	○	○	○
Smokeless tobacco	○	○	○
Alcohol (beer, wine, liquor)	○	○	○
Marijuana (pot, hash, hash oil)	○	○	○
Cocaine (crack, rock, freebase)	○	○	○
Amphetamines (diet pills, speed, meth, crank)	○	○	○
Rohypnol (roofies), GHB or Liquid X (intentional use)	○	○	○
Other drugs	○	○	○

One drink or alcoholic beverage is defined as a 12 oz. beer, a 4 oz. glass of wine, a shot of liquor, or a mixed drink.

11. Within the last 30 days, did you: (Mark one for each row)	Yes	No	Not applicable/Don't drink	Not applicable/Don't drive
Drive after drinking any alcohol at all	○	○	○	○
Drive after having 5 or more drinks	○	○	○	○

12. The last time you "partied"/socialized, how many hours did you drink alcohol? State your best estimate. (If less than 10, code answers as 00, 01, 02, etc.)

HOURS: 00 01 02 03 04 05 06 07 08 09

13. The last time you "partied"/socialized, how many alcoholic drinks did you have? State your best estimate. (If less than 10, code answers as 00, 01, 02, etc.)

DRINKS: 00 01 02 03 04 05 06 07 08 09

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14. In the **last two weeks**, on how many occasions did you drink the same or more alcohol as indicated in item #13? State your best estimate. (If less than 10, code answers as 00, 01, 02, etc.)

TIMES

15. How many alcoholic **drinks** do you think **the typical student at your school** had the last time he/she "partied"/socialized? (If less than 10, code answers as 00, 01, 02, etc.)

DRINKS

16. Think back over the **last two weeks**. How many times, if any, have you had five or more alcoholic drinks at a sitting?

○ None ○ 2 times ○ 4 times ○ 6 times ○ 8 times
○ 1 time ○ 3 times ○ 5 times ○ 7 times ○ 9 or more times

(Please mark the appropriate column for each row)

17. During the **last 12 months**, if you "partied"/socialized, how often did you...

	Always	Usually	Sometimes	Rarely	Never	Not applicable/Don't drink
Alternate non-alcoholic with alcoholic beverages	○	○	○	○	○	○
Determine, in advance, not to exceed a set number of drinks	○	○	○	○	○	○
Choose not to drink alcohol	○	○	○	○	○	○
Use a designated driver	○	○	○	○	○	○
Eat before and/or during drinking	○	○	○	○	○	○
Have a friend let you know when you've had enough	○	○	○	○	○	○
Keep track of how many drinks you were having	○	○	○	○	○	○
Pace your drinks to 1 or fewer per hour	○	○	○	○	○	○
Avoid drinking games	○	○	○	○	○	○
Drink an alcohol look-alike (non-alcoholic beer, punch etc.)	○	○	○	○	○	○

(Please mark the appropriate column for each row)

18. If you drink alcohol, within the **last 12 months**, have you experienced any to the following **as a consequence of your drinking**?

	Yes	No	Not applicable/Don't drink
Physically injured yourself	○	○	○
Physically injured another person	○	○	○
Been involved in a fight	○	○	○
Did something you later regretted	○	○	○
Forgot where you were or what you did	○	○	○
Had someone use force or threat of force to have sex with you	○	○	○
Had unprotected sex	○	○	○

19. Within the **last 30 days**, what **percent** of students at your school used? State your best estimate.

% Used Cigarettes

% Used Alcohol

% Used Rohypnol or GHB

The next 13 questions ask about sex behavior, perceptions, and contraception.

20. Within the **last 12 months**, with how many partners, if any, have you had sex (oral, vaginal, or anal)? (If less than 10, code answers as 00, 01, 02, etc.) → PARTNERS

21. Within **last 12 months**, were your sexual partner(s), if any,
○ N/A ○ Female
○ Male ○ Both Male and Female

22. Within the **last 12 months**, with how many partners do you think **the typical student at your school** has had sex (oral, vaginal, or anal)? (If less than 10, code answers as 00, 01, 02, etc.) → PARTNERS

(Please mark the appropriate column for each row)

	Have not done this during **last 30 days** / Never did this sexual activity	1-2 times	3-4 times	5-6 times	7-8 times	9-10 times	11 or more times
23. Within the **last 30 days**, if you are sexually active, how many times did you have:							
Oral sex?	○	○	○	○	○	○	○
Vaginal Intercourse?	○	○	○	○	○	○	○
Anal Intercourse?	○	○	○	○	○	○	○

(Please mark the appropriate column for each row)

	0 times	1-2 times	3-4 times	5-6 times	7-8 times	9-10 times	11 or more times
24. How many times within the **last 30 days** do you think **the typical student at your school** has had:							
Oral sex?	○	○	○	○	○	○	○
Vaginal Intercourse?	○	○	○	○	○	○	○
Anal Intercourse?	○	○	○	○	○	○	○

CONDOM USE

(Please mark the appropriate column for each row)

	Have not done this during last 30 days / Never did this sexual activity	Never	Rarely	Sometimes	Mostly	Always
25. Within the **last 30 days**, if you are sexually active, how often did you or your partner(s) use a condom during:						
Oral sex?	○	○	○	○	○	○
Vaginal Intercourse?	○	○	○	○	○	○
Anal Intercourse?	○	○	○	○	○	○

CONDOM USE

(Please mark the appropriate column for each row)

	The typical student at my school does not participate in this sexual activity	Never	Rarely	Sometimes	Mostly	Always
26. Within the **last 30 days**, how often do you think **the typical student at your school** has used a condom during:						
Oral sex?	○	○	○	○	○	○
Vaginal Intercourse?	○	○	○	○	○	○
Anal Intercourse?	○	○	○	○	○	○

(Please mark the appropriate column for each row)

27. If you are sexually active, did you use a condom the last time you had:	No	Yes	Never did this sexual activity	Don't know/Don't remember
Oral sex?	○	○	○	○
Vaginal Intercourse?	○	○	○	○
Anal Intercourse?	○	○	○	○

28. If you have had vaginal intercourse, what method did you or your partner use to prevent pregnancy the last time? (Select all that apply)

- ○ Have not had vaginal intercourse
- ○ Birth control pills
- ○ Depo Provera (shots)
- ○ Norplant (implant)
- ○ Condoms (male or female)
- ○ Diaphragm/Cervical cap/Sponge
- ○ Spermicide (e.g. foam)
- ○ Fertility awareness (calendar, mucous, basal body temperature)
- ○ Withdrawal
- ○ Other method
- ○ Nothing

29. Within the last 12 months, if you are sexually active, have you or your partner(s) used emergency contraception ("morning after pill")?

○ No ○ Yes ○ Don't know ○ Not sexually active

30. Within the last 12 months, have you unintentionally become pregnant or gotten someone else pregnant?

- ○ Have not had vaginal intercourse within the last 12 months.
- ○ No
- ○ Yes
- ○ Don't know

31. Have you ever been tested for HIV infection?

○ No ○ Yes ○ Don't know

32. Which of the following best describes you?

○ Heterosexual ○ Bisexual ○ Unsure
○ Gay/Lesbian ○ Transgendered

33. If you have a credit card(s) how much total credit card debt did you carry last month? That is, what was the total unpaid balance on all of your credit cards (that you are responsible for paying)?

- ○ None, I don't have any credit cards/I'm not responsible for paying
- ○ None, I pay the full amount each month
- ○ $1 - $99
- ○ $100 - $249
- ○ $250 - $499
- ○ $500 - $999
- ○ $1,000 - $1,999
- ○ $2,000 - $2,999
- ○ $3,000 - $3,999
- ○ $4,000 - $4,999
- ○ $5,000 - $5,999
- ○ $6,000 or more

34. What is your approximate cumulative grade average?

○ A ○ B ○ C ○ D/F ○ N/A

The next 5 questions ask about weight, nutrition, and exercise.

35. How do you describe your weight?

- ○ Very underweight
- ○ Slightly underweight
- ○ About the right weight
- ○ Slightly overweight
- ○ Very overweight

36. Are you trying to do any of the following about your weight?

- ○ I am not trying to do anything about my weight
- ○ Stay the same weight
- ○ Lose weight
- ○ Gain weight

37. Within the last 30 days, did you do any of the following? (Select all that apply)

- ○ Exercise to lose weight
- ○ Diet to lose weight
- ○ Vomit or take laxatives to lose weight
- ○ Take diet pills to lose weight
- ○ I didn't do any of the above

38. How many servings of fruits and vegetables do you usually have per day (1 serving = 1 medium piece of fruit, 1/2 cup chopped, cooked or canned fruits/vegetables, 3/4 cup fruit/vegetable juice, small bowl of salad greens, or 1/2 cup dried fruit)?

- ○ I don't eat fruits and vegetables
- ○ 1-2
- ○ 3-4
- ○ 5 or more

(Please mark the appropriate column for each row)

39. On how many of the past 7 days did you:	0 days	1 day	2 days	3 days	4 days	5 days	6 days	7 days
Participate in vigorous exercise for at least 20 minutes or moderate exercise for at least 30 minutes?	○	○	○	○	○	○	○	○
Do exercises to strengthen or tone your muscles, such as push-ups, sit-ups, or weight lifting?	○	○	○	○	○	○	○	○
Get enough sleep so that you felt rested when you woke up in the morning?	○	○	○	○	○	○	○	○

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The next 4 questions ask about mental and physical health.

(Please mark the appropriate column for each row)

40. Within the **last 12 months** how many times have you:

	Never	1-2 times	3-4 times	5-6 times	7-8 times	9-10 times	11 or more times
Felt things were hopeless	○	○	○	○	○	○	○
Felt overwhelmed by all you had to do	○	○	○	○	○	○	○
Felt exhausted (not from physical activity)	○	○	○	○	○	○	○
Felt very sad	○	○	○	○	○	○	○
Felt so depressed that it was difficult to function	○	○	○	○	○	○	○
Seriously considered attempting suicide	○	○	○	○	○	○	○
Attempted suicide	○	○	○	○	○	○	○

41. Have you ever been diagnosed with depression?

○ Yes ○ No

(If you responded "no," please go to question 42)

	Yes	No
If Yes: Have you been diagnosed with depression within the last 12 months?	○	○
Are you currently in therapy for depression?	○	○
Are you currently taking medication for depression?	○	○

(Please mark the appropriate column for each row)

42. Have you:

	Yes	No	Don't Know
Been vaccinated against hepatitis B?	○	○	○
Been vaccinated against meningococcal disease (meningococcal meningitis)?	○	○	○
Been vaccinated against varicella (chicken pox)?	○	○	○
Been vaccinated with measles, mumps, rubella (2 shots)?	○	○	○
Been vaccinated against influenza (the flu) in the last year?	○	○	○
Had a dental exam and cleaning in the last year?	○	○	○
(Males) Performed testicular self exam in the last month?	○	○	○
(Females) Performed breast self exam in the last month?	○	○	○
(Females) Had a routine gynecological exam in the last year?	○	○	○
Had your blood pressure checked in the last 2 years?	○	○	○
Had your cholesterol checked in the last 5 years?	○	○	○
Used sunscreen daily?	○	○	○

43. (Please make two marks in the appropriate columns for each row)

	Have you ever been diagnosed with any of the following? Yes	Have you ever been diagnosed with any of the following? No	Within the last 12 months, have you had any of the following? Yes	Within the last 12 months, have you had any of the following? No
Allergy problems	○	○	○	○
Anorexia	○	○	○	○
Anxiety Disorder	○	○	○	○
Asthma	○	○	○	○
Bulimia	○	○	○	○
Chronic Fatigue Syndrome	○	○	○	○
Depression	○	○	○	○
Diabetes	○	○	○	○
Endometriosis	○	○	○	○
Genital herpes	○	○	○	○
Genital warts/HPV	○	○	○	○
Hepatitis B or C	○	○	○	○
High blood pressure	○	○	○	○
High cholesterol	○	○	○	○
HIV infection	○	○	○	○
Repetitive stress injury (e.g. carpal tunnel syndrome)	○	○	○	○
Seasonal Affective Disorder	○	○	○	○
Substance abuse problem	○	○	○	○
Back pain	○	○	○	○
Broken bone/fracture	○	○	○	○
Bronchitis	○	○	○	○
Chlamydia	○	○	○	○
Ear infection	○	○	○	○
Gonorrhea	○	○	○	○
Mononucleosis	○	○	○	○
Pelvic Inflammatory Disease	○	○	○	○
Sinus infection	○	○	○	○
Strep throat	○	○	○	○
Tuberculosis	○	○	○	○

The next question asks about impediments to academic performance.

Received an incomplete or dropped the course
Received a lower grade in the course
Received a lower grade on an exam or important project
I have experienced this issue but my academics have not been affected
This did not happen to me/not applicable

44. Within the last 12 months, have any of the following affected your academic performance? (Please select the most serious outcome for each item below)

	✓	✓	✓	✓	✓
Alcohol use	○	○	○	○	○
Allergies	○	○	○	○	○
Assault (physical)	○	○	○	○	○
Assault (sexual)	○	○	○	○	○
Attention Deficit Disorder	○	○	○	○	○
Cold/Flu/Sore throat	○	○	○	○	○
Concern for a troubled friend or family member	○	○	○	○	○
Chronic illness (diabetes, asthma, etc.)	○	○	○	○	○
Chronic pain	○	○	○	○	○
Death of a friend or family member	○	○	○	○	○
Depression/Anxiety Disorder/ Seasonal Affective Disorder	○	○	○	○	○
Drug use	○	○	○	○	○
Eating disorder/problem	○	○	○	○	○
HIV Infection	○	○	○	○	○
Injury	○	○	○	○	○
Internet use/computer games	○	○	○	○	○
Learning disability	○	○	○	○	○
Mononucleosis	○	○	○	○	○
Pregnancy (yours or your partner's)	○	○	○	○	○
Relationship difficulty	○	○	○	○	○
Sexually transmitted disease	○	○	○	○	○
Sinus infection/ear infection/bronchitis/strep throat	○	○	○	○	○
Sleep difficulties	○	○	○	○	○
Stress	○	○	○	○	○
Other _____	○	○	○	○	○

The last questions ask about demographic characteristics.

45. How old are you? → Years (00 01 02 03 04 05 06 07 08 09)

46. What is your sex?
- ○ Female
- ○ Male

47. What is your height in feet and inches? → HEIGHT: Ft. (0 1 2 3 4 5 6 7 8 9) Inch (00 01 02 03 04 05 06 07 08 09 10 11)

48. What is your weight in pounds? → WEIGHT: Pounds (000 001 002 003 004 005 006 007 008 009)

49. Year in school:
- ○ 1st year undergraduate
- ○ 2nd year undergraduate
- ○ 3rd year undergraduate
- ○ 4th year undergraduate
- ○ 5th year or more undergraduate
- ○ Graduate or professional
- ○ Adult special
- ○ Other

50. Are you a full-time student?
- ○ Yes ○ No

51. How do you usually describe yourself? (Mark all that apply)
- ○ White - not Hispanic (includes Middle Eastern)
- ○ Black - not Hispanic
- ○ Hispanic or Latino
- ○ Asian or Pacific Islander
- ○ American Indian or Alaskan Native
- ○ Other

52. Are you an international student? ○ Yes ○ No

53. What is your current relationship status?
- ○ Single
- ○ Married/domestic partner
- ○ Engaged or committed dating relationship
- ○ Separated
- ○ Divorced
- ○ Widowed

54. Where do you currently live?
- ○ Campus residence hall
- ○ Fraternity or sorority house
- ○ Other university/college housing
- ○ Off-campus housing
- ○ Parent/guardian's home
- ○ Other

55. Are you a member of a social fraternity or sorority? (National Interfraternity Conference, National Panhellenic Conference, or National Pan-Hellenic Council)
- ○ Yes ○ No

56. How many hours a week do you work for pay?
- ○ 0 hours
- ○ 1-9 hours
- ○ 10-19 hours
- ○ 20-29 hours
- ○ 30-39 hours
- ○ 40 hours
- ○ more than 40 hours

57. How many hours a week do you volunteer?
- ○ 0 hours
- ○ 1-9 hours
- ○ 10-19 hours
- ○ 20-29 hours
- ○ 30-39 hours
- ○ 40 hours
- ○ more than 40 hours

58. Do you have any kind of health insurance (including prepaid plans such as HMOs - health maintenance organizations)?
- ○ Yes ○ No ○ Not sure

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THANK YOU FOR COMPLETING THIS SURVEY

PLEASE DO NOT WRITE IN THIS AREA

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